

CLAIMS

1. A chromatographic quantitative measurement apparatus for measuring concentrations of at least one analyte contained in liquid sample,
5 comprising:

a chromatographic strip with a plurality of reaction areas, each of said plurality of reaction areas retaining binding reagent that can take on coloration by a specific reaction with said at least one analyte; and

coloration level measuring means to conduct quantitative
10 measurement with numerical expression on coloration level of at least two or more reaction areas out of said plurality of reaction areas,

wherein said coloration level measuring means have a function of conducting at least one measurement of an optical measurement and an image measurement of said coloration level of the coloration that occurs in the
15 specific reaction between said binding reagent and said analytes.

2. The chromatographic quantitative measurement apparatus according to Claim 1, further comprising a computation processing device, said computation processing device having a computation process for processing
20 measurement result of said coloration level and deriving the concentration of said analytes in the numerical expression.

3. The chromatographic quantitative measurement apparatus according to Claim 1,

25 wherein said chromatographic strip includes a sheet-like solid support and at least one reactive layer superimposed on said support,

wherein said reactive layer has said plurality of reaction areas disposed on said reactive layer uniformly;

wherein said reactive layer has wettable materials that can be moistened with said liquid sample;
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wherein said binding reagent is contained in said wettable materials;
wherein said binding reagent reacts with substance containing said

analytes to undergo coloration reaction; and

said coloration level measuring means to have coloration condition measured over said plurality of reaction areas disposed on said reaction layer uniformly.

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4. The chromatographic quantitative measurement apparatus according to Claim 1,

wherein said chromatographic strip includes a sheet-like solid support, a test sample loading area, a labeling reagent holding layer, at least one reactive layer and absorption layer,

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wherein said labeling reagent holding layer, at least one reactive layer and absorption layer are, respectively, disposed on said support;

wherein said reactive layer has said plurality of reaction areas; and

wherein said liquid sample passes through said test sample loading area, said labeling reagent holding layer, said reactive layer and said absorption layer successively in this order.

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5. The chromatographic quantitative measurement apparatus according to Claim 1,

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wherein said plurality of reaction areas includes at least one reaction area of a plurality of dot-like areas and a plurality of spots-like shaped reaction areas; and

wherein said coloration level measuring means measures a coloration level of said at least one reaction areas.

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6. The chromatographic quantitative measurement apparatus according to Claim 1,

wherein said chromatographic strip includes at least one reactive layer; and

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wherein said pluralities of reaction areas are disposed all over said reactive layer.

7. The chromatographic quantitative measurement apparatus according to Claim 1,

wherein said chromatographic strip includes at least one reactive layer;

wherein said reactive layer has wettable materials to allow said liquid sample to be moistened;

wherein said binding reagent is contained in said wettable materials;

wherein said plurality of reaction areas are disposed all over said reactive layer; and

wherein a concentration of said binding reagent in said wettable materials are consistent in all areas of said plurality of reaction areas.

8. The chromatographic quantitative measurement apparatus according to Claim 1,

wherein said coloration level measuring means includes at least one device selected from the group consisting of a device to read an absorption signal corresponding to said coloration, a device to read a reflection signal of said coloration and an image analyzing device equipped with CCD.

9. The chromatographic quantitative measurement apparatus according to Claim 1,

wherein said chromatographic strip further includes a labeling reagent holding layer;

wherein said labeling reagent layer has labeling reagent capable of bonding with at least one of said analytes and said binding reagent; and

wherein said coloration occurs by bonding reaction between said binding reagent and said labeled reagent.

10. The chromatographic quantitative measurement apparatus according to Claim 1,

wherein said chromatographic strip includes a sheet-like solid support and a plurality of wettable materials disposed on said support;

wherein said plurality of wettable materials can be moistened with said liquid sample;

wherein said plurality of wettable materials have, respectively, a test sample loading area, labeling reagent holding layer, at least one reactive layer, and an absorption layer, which are formed parallel on a surface of said support;

wherein said reactive layer has said plurality of reaction areas; and

wherein said liquid sample passes through said test sample loading area, said labeling reagent holding layer, said reactive layer and said absorption layer successively in this order.

11. The chromatographic quantitative measurement apparatus according to Claim 10,

wherein said plurality of reaction areas have a plurality of spots; and

wherein said coloration level measuring means carries out quantitative measurement of the coloration level of said plurality of spots.

12. The chromatographic quantitative measurement apparatus according to Claim 10,

wherein said plurality of reaction areas are formed all over said reactive layer; and

wherein said coloration level measuring mean carries out quantitative measurement of the coloration level of said reactive layer.

13. The chromatographic quantitative measurement apparatus according to Claim 10,

wherein said plurality of reaction areas are formed all over said reactive layer;

wherein a concentration of said binding reagent is consistent all over said reactive layer; and

wherein said coloration level measuring means carries out quantitative measurement of the coloration level of said reactive layer.

14. The chromatographic quantitative measurement apparatus according to Claim 10,

wherein said labeling reagent holding layer has labeling reagent capable of forming a bond with at least one selected from said analytes and said binding reagent; and

wherein said coloration occurs by bonding reactions between said binding reagent and said labeling reagent.

15. A method of chromatographic quantitative measurement to measure a concentration of at least one analyte contained in liquid sample, comprising the steps of:

(a) providing a chromatographic strip that has a plurality of reaction areas immobilizing a binding reagent capable of forming a specific bond with at least one analyte;

(b) moistening said chromatographic strip moistened with liquid sample containing said analytes, and bringing a substance containing said analytes into contact with said binding reagent; and

(c) measuring a condition of coloration in at least two reaction areas of said plurality of reaction areas, said coloration being taken on by specific bond between said binding reagent and said analytes, said coloration being measured by way of at least one measurement of an optical measurement and an image measurement, and deriving by computation a concentration in a numerical expression by subjecting a foregoing measurement result to computation processing.

16. The method of chromatographic quantitative measurement according to Claim 15,

wherein said chromatographic strip has wettable materials;

wherein said binding reagent is immobilized in said wettable materials; and

wherein in said step (b), while said liquid sample passes through

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said wettable materials, said substance containing said analytes reacts with said binding reagent, and said coloration occurs.

17. The method of chromatographic quantitative measurement ac-
5 cording to Claim 15,

wherein said chromatographic strip has at least one reactive layer;

wherein said plurality of reaction areas are formed on said reactive layer in spots-like topology; and

wherein said condition of coloration of said spots-like topology is
10 measured with the numerical expression in said step (c).

18. The method of chromatographic quantitative measurement ac-
cording to Claim 15,

wherein each of said binding reagents contained in said plurality of
15 reaction areas has identical binding reagent.

19. The method of chromatographic quantitative measurement ac-
cording to Claim 15,

wherein said chromatographic strip has at least one reactive layer; and

20 wherein said plurality of reaction areas are formed all over said reactive layer.

20. The method of chromatographic quantitative measurement according
to Claim 15,

25 wherein said chromatographic strip has wettable materials;

wherein said binding reagent is immobilized in said wettable materials;

and

wherein a concentration of said binding reagent in said wettable mate-
rials is identical throughout all of said plurality of reaction areas.

21. The method of chromatographic quantitative measurement ac-
cording to Claim 15,

wherein said chromatographic strip has a sheet-like solid support and a plurality of wettable materials disposed on said support;

wherein said plurality of wettable materials can be moistened with said liquid sample;

5 wherein said plurality of wettable materials have, respectively, a test sample loading area, a labeling reagent holding layer, at least one reactive layer and an absorption layer that are all disposed parallel on a surface of said support;

wherein said reactive layer has said plurality of reaction areas;

10 wherein said liquid sample passes through said test sample loading area, said labeling reagent holding layer, said reactive layer and said absorption layer successively in this order;

wherein said labeling reagent holding layer has labeling reagent capable of forming bond with at least one selected from said analytes and said binding reagent; and

15 wherein said coloration occurs by bonding reaction occurring between said binding reagent and said labeling reagent.

22. A chromatographic strip for measuring a concentration of at least one analyte contained in liquid sample by conducting at least one measurement selected from optical measurement and image measurement, comprising:

wettable materials that can be moistened with liquid sample; and

binding reagent put in said wettable materials,

25 wherein said binding reagent has a nature capable of taking on a coloration as a result of specific reaction with substance that contains said analytes; and

wherein said binding reagent is contained in said wettable materials uniformly.

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23. The chromatographic strip according to Claim 22,

wherein said wettable materials has a test sample loading area, a

labeling reagent holding layer, at least one reactive layer and an absorption layer;

wherein said reactive layer has a plurality of reaction areas, each of said plurality of reaction areas containing said binding reagent; and

wherein said liquid sample is allowed to pass through said test sample loading area, said labeling reagent holding layer, said reactive layer and said absorption layer successively in this order.

24. The chromatographic strip according to Claim 23, wherein said plurality of reaction areas have a plurality of spots; and wherein coloration level of each of said plurality of spots is allowed to be measured quantitatively by conducting at least one measurement of said optical measurement and said image measurement.

25. The chromatographic strip according to Claim 23, wherein said wettable materials has at least one reactive layer; and wherein said plurality of reaction areas are formed all over said reactive layer.

26. The chromatographic strip according to Claim 23, wherein a concentration of said binding reagent in said wettable materials is consistent throughout all areas of said plurality of reaction areas.

27. The chromatographic strip according to Claim 22, wherein said plurality of wettable materials can be moistened with said liquid sample;

wherein said plurality of wettable materials have, respectively, a test sample loading area, labeling reagent holding layer, at least one reactive layer and absorption layer that are all formed parallel on a surface of said support;

wherein said reactive layer has said plurality of reaction areas; wherein said liquid sample passes through said test sample loading area, said labeling reagent holding layer, said reactive layer and said ab-

sorption layer successively in this order; and

wherein said labeling reagent holding layer has labeling reagent capable of forming bond with at least one selected from said analytes and said binding reagent, and said coloration occurs by bonding reaction occurring

5 between said binding reagent and said labeling reagent.

28. The chromatographic strip according to Claim 23,

wherein said plurality of reaction areas is disposed all over said reactive layer in a uniformly dispersed manner.

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